

Claims

1. (Currently amended) A radioisotope carrier, comprising:

(a) a stimulus-sensitive methacrylamide gelling polymer in an aqueous solution which gelling polymer changes from a first fluent state to a second, less fluent state upon exposure to an increase in temperature, a change in ionic strength, and/or a change in pH, wherein the gelling polymer remains in the second, less fluent state upon dilution; and

(b) an aqueous insoluble or confined radioisotope mixed with said gelling polymer as said radioisotope carrier.

2. (Previously presented) The radioisotope carrier as recited in claim 1, wherein said gelling polymer is selected from the group consisting of biodegradable polymer, cellulose derivative, {agar, gelatin, chitosin} chitosan, slowly polymerizing alginate gel, {gelling copolymer,} and combinations thereof.

3. (Cancelled)

4. (Cancelled)

5. (Previously presented) A radioisotope carrier comprising:

a gelling copolymer comprising

(a) a linear random copolymer in an aqueous solvent, having

(i) an [meth-]acrylamide derivative; and

(ii) a hydrophilic comonomer; said linear random copolymer in the form of a plurality of linear chains having a plurality of molecular weights greater than or equal to a minimum gelling molecular weight cutoff;

(b) the aqueous solvent mixed with said linear random copolymer as a reversible gelling solution; and

(c) an aqueous insoluble or confined radioisotope mixed with said gelling copolymer as said radioisotope carrier.

6. (Original) The radioisotope carrier as recited in claim 5, wherein an amount of said

hydrophilic comonomer in the linear random copolymer is less than about 10 mole%.

7. (Original) The radioisotope carrier as recited in claim 6, wherein said amount is about 2 mole%.

8. (Original) The radioisotope carrier as recited in claim 5, wherein said [meth-]acrylamide derivative is an N,N'-alkyl substituted [meth-]acrylamides.

9. (Original) The radioisotope carrier as recited in claim 8, wherein said N,N'-alkyl substituted [meth-]acrylamide is selected from the group consisting of N-isopropyl[meth-]acrylamide, N,N'-diethyl[meth-]acrylamide, N-[meth-]acryloylpyrrolidine, N-ethyl[meth-]acrylamide, and combinations thereof.

10. (Original) The radioisotope carrier as recited in claim 5, wherein said hydrophilic comonomer is hydrophilic [meth-]acryl- compound.

11. (Original) The radioisotope carrier as recited in claim 10, wherein said hydrophilic [meth-]acryl- compound is selected from the group consisting of carboxylic acid, [meth-]acrylamide, hydrophilic [meth-]acrylic acid ester, hydrophilic [meth-]acrylamide derivatives and combinations thereof.

12. (Original) The radioisotope carrier as recited in claim 11, wherein said carboxylic acid is selected from the group consisting of acrylic acid, methacrylic acid and combinations thereof.

13. (Original) The radioisotope carrier as recited in claim 11, wherein said hydrophilic [meth-]acrylamide derivatives are selected from the group consisting of N,N-diethyl[meth-]acrylamide, 2-[N,N-dimethylamino]ethyl[meth-]acrylamide, 2-[N, N-diethylamino]ethyl[meth-]acrylamide, or combinations thereof.

14. (Original) The radioisotope carrier as recited in claim 11, wherein said hydrophilic [meth-]acrylic ester is selected from the group consisting of 2-[N,N-diethylamino]ethyl[meth-]acrylate, 2-[N,N-dimethylamino]ethyl[meth-]acrylate, and combinations thereof.

15. (Original) The radioisotope carrier as recited in claim 5, wherein said aqueous solvent is selected from the group consisting of water, and aqueous salt solution.

16. (Original) The radioisotope carrier as recited in claim 15, wherein said salt solution is a phosphate buffered saline.

17. (Original) The radioisotope carrier as recited in claim 16, wherein an amount of said solvent is from about 70 wt% to about 99 wt%.

18. (Original) The radioisotope carrier as recited in claim 1, wherein said radioisotope is selected from the group consisting of yttrium-90, indium-111, radium-223, actinium-225, bismuth-212, bismuth-213, scandium-47, astatine-211, rhenium-186, rhenium-188, iodine-131, iodine-124, lutetium-177, holmium-166, ~amarium-153, copper-64, copper-67, phosphorus-32 and combinations thereof.

19. (Original) The radioisotope carrier as recited in claim 1, wherein said confined radioisotope is selected from the group of chelators, capsules and combinations thereof.

20. (Previously presented) The radioisotope carrier as recited in claim 19, wherein said chelators are selected from the group consisting of 1,4,7,10-tetraazacyclododecane-N, N',N'', N'''-tetraacetic acid (DOTA), tetra-t-butyl-calix[4]arene-crown-6-dicarboxylic acid (TBBCDA), 5,11,17,23-tetra-t-butyl-25,26,27,28-tetrakis(carboxymethoxy)-calix[6]arene (HBHC), diethylenetriamine-pentaacetic acid (DTPA), EDTA, and combinations thereof.

21. (Original) The radioisotope carrier as recited in claim 19, wherein said capsules are selected from the group of glass beads, polymer beads and combinations thereof.

22. (Original) The radioisotope carrier as recited in claim 1, further comprising a contrast agent.

23. (Original) The radioisotope carrier as recited in claim 22, wherein said contrast agent is selected from the group of gamma-emitting radioisotope, ultrasound contrast enhancing agent, paramagnetic isotope, positron-emitting radioisotope and combinations thereof.

24. (Original) The radioisotope carrier as recited in claim 23, wherein said gamma-emitting radioisotope is selected from the group of Tc-99m, In-111, Rh-186, Rh-188, Th-201, Ga-67, Y-86, Y-91, I-131, F-18, Cu-64, Cu-67, As-74, Zr-89 and combinations thereof.

25. (Original) The radioisotope carrier as recited in claim 23, wherein said ultrasound contrast enhancing agent is a plurality of air-filled albumin-coated microspheres, human serum albumin with octofluoropropane.

26. (Original) The radioisotope carrier as recited in claim 23, wherein said paramagnetic isotope is gadolinium.

27. (Original) The radioisotope carrier as recited in claim 26, wherein said gadolinium is a chelate selected from the group consisting of gadolinium-DTPA, gadolinium-EDTA and combinations thereof.

28. (Currently amended) A radioisotope carrier, comprising:

(a) a reversible stimulus-sensitive methacrylamide gelling polymer in an aqueous solution which gelling polymer changes from a liquid state to a gel state upon exposure to a change in temperature, ionic strength, sheer stress, and/or in pH, wherein the gelling polymer is in a liquid state at temperatures in a range of from about 20 °C to about 30 °C; and

(b) an aqueous insoluble or confined radioisotope mixed with said gelling polymer as said radioisotope carrier.

29. (Currently amended) A radioisotope carrier, comprising:

(a) a reversible stimulus-sensitive methacrylamide gelling polymer in an aqueous solution, which gelling polymer changes from a first fluent state to a second, less fluent state upon exposure to a specific stimulus comprising a change in temperature, ionic strength, sheer stress, and/or pH, wherein the gelling polymer reverses from the second, less fluent state to the first fluent state only when the specific stimulus is reversed; and

(b) an aqueous insoluble or confined radioisotope mixed with said gelling polymer as said radioisotope carrier.